

Notice of Allowability

Application No.

09/938,528

Examiner

David S Blum

Applicant(s)

ARITA ET AL.

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/20/03.
2. ☒ The allowed claim(s) is/are 1,4 and 5.
3. ☒ The drawings filed on 20 November 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
* Certified copies not received: _____.
5. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
(a) ☐ The translation of the foreign language provisional application has been received.
6. ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

7. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
8. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No. _____.
(b) ☐ including changes required by the proposed drawing correction filed _____, which has been approved by the Examiner.
(c) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No. _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the margin according to 37 CFR 1.121(d).

9. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- 1 ☐ Notice of References Cited (PTO-892)
2 ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3 ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No. _____
4 ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
- 5 ☐ Notice of Informal Patent Application (PTO-152)
6 ☒ Interview Summary (PTO-413), Paper No. 20031210
7 ☐ Examiner's Amendment/Comment
8 ☒ Examiner's Statement of Reasons for Allowance
9 ☐ Other

This action is in response to amendment filed 11/20/03.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Donald R. Studebaker on 12/10/03.

The application has been amended as follows:

Replace claim 1 with amended claim 1.

CLAIM 1

1. A method for manufacturing a semiconductor device, comprising the steps of:

forming, in a semiconductor layer formed on a first insulating film, an element isolation groove extending to the first insulating film;

depositing a second insulating film so as to partially fill the element isolation groove by using a vapor deposition method;

forming an embedded layer on the second insulating film so as to completely fill the element isolation groove; and

forming a third insulating film on the embedded layer,

wherein the step of forming the element isolation groove includes another step of forming at least a pair of element isolation grooves with respect to one element formation region of the semiconductor layer;

in the step of forming the third insulating film, the third insulating film is formed such that the pair of element isolation grooves are continuously covered,

second insulating film and the third insulating film are composed of SiO₂

the pair of element isolation grooves sandwich a region other than the element formation region, and

the third insulation region continuously covers the pair of element isolation grooves and the region other than the element formation region in the completed device.

Reasons for Allowance Subject Matter

2. Claims 1 and 4-5 are allowed.
3. The following is an examiner's statement of reasons for allowance:

Claim 1 contains the limitation for forming a semiconductor device where an embedded layer is formed on a second insulating layer so that an isolation groove (trench) is filled

and then a third isolation layer is formed that continuously covers at least two element isolation grooves and the region other than the element formation region (as claimed, a region between two isolation grooves), and remains so in the completed device (support for this is shown on pages 24 (line 24) to 25 (line 8) of the instant specification.). This limitation, in combination with the other limitations of claim 1 is not taught or suggested by the prior art of record. Razouk (US005581110A) forms a third isolation layer is formed and continuously covers over at least two element isolation grooves and the region other than the element formation region, but Razouk etches the third layer back so that it covers only the isolation groove and a small region outside the groove. The layer no longer extends over the non-element formation region. Bajor (US 5,504,033) etches back the third layer so that it also is only a cap over the isolation groove.

Claims 3-4 are allowed as being properly dependent upon allowed claim 1.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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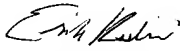
4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Blum whose telephone number is (703)-306-9168 (after approximately 02/05/04 (7571-272-1687) and e-mail address is

David.blum@USPTO.gov .

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr., can be reached at (703)-308-4940. Our facsimile number all patent correspondence to be entered into an application is (703) 872-9306. The facsimile number for customer service is (703)-872-9317. Our receptionist's number is (703)-308-0956.

David S. Blum

December 12, 2003


ERIK J. KIELIN
PRIMARY EXAMINER